

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-3, 5-28, and 30-32 are pending in the present application with Claims 8-25 withdrawn from consideration. Claims 1, 5-7, 26, and 30-32 are amended by the present amendment and Claims 4 and 29 are canceled without prejudice by the present amendment.

In the outstanding Office Action, Claims 1-7 and 26-32 were rejected under 35 U.S.C. §112, first paragraph; Claims 1, 2, 26, and 27 were rejected under 35 U.S.C. §102(b) as anticipated by Besson et al. (U.S. Patent 4,633,156, herein “Besson”); and Claims 3-7 and 28-32 were rejected under 35 U.S.C. §103(a) as unpatentable over Besson in view of Chambers et al. (U.S. Patent 6,469,469, herein “Chambers”).

In view of the rejection of Claims 1-7 and 26-32 under 35 U.S.C. §112, first paragraph, independent Claims 1 and 26 have been amended to replace the language “high-level” with the language “low-level” as suggested by the outstanding Office Action and as disclosed in the specification in the paragraph bridging pages 44 and 45. No new matter has been added. Accordingly, it is respectfully requested this rejection be withdrawn.

In view of the remaining outstanding rejections on the merits, independent Claims 1 and 26 have been amended to more clearly recite that a viscosity resistance of a motor is determined by adjusting a ratio of a first off-state as to a second off-state during a period in which no current is supplied to coils. The claim amendments find support in the originally filed Claims 4 and 29, which are now canceled. No new matter has been added.

Briefly recapitulating, amended Claim 1 is directed to a motor having a controller for generating a rotational torque due to a predetermined magnetic flux distribution formed by controlling supplied current to coils. The controller includes coil on/off switching means and coil current control means. The coil on/off switching means performs switching operations

between an on-state in which current is supplied to the coils, and a first off-state, in which the coil terminals are open-circuited, and between the on-state and a second off-state in which the coil terminals are short-circuited. The coil current control means controls the motor to have a viscosity resistance by adjusting a ratio of the first off-state and the second off-state during a period in which no current is supplied to the coils. Independent Claim 26 has been amended similar to Claim 1.

The device of independent Claims 1 and 26 advantageously corrects an irregularity in torque from torque loss or cogging, and a small compliance problem due to braking as disclosed in the specification at page 41, second full paragraph.

Turning to the applied art, Besson discloses a stepping motor assembly that is capable of opening or short circuiting a winding of an engine depending on a speed of the motor as disclosed at column 5, lines 15-29. However, as recognized by the outstanding Office Action in the paragraph bridging pages 3 and 4, Besson does not teach or suggest that the motor can be controlled to have a viscosity resistance by adjusting a ratio of the first and second off-states during a period when no current is supplied.

To cure this deficiency, the outstanding Office Action relies on Chambers, and more specifically on the description of Chambers at column 7, lines 50-67.

Chambers discloses at column 7, lines 50-67, that a power factor of an induction motor varies between 0.75 and 1.0 and the reason why the motor power factor is not constant is because its value depends upon the ratio of the “input reactance to the input resistance.” Further, Chambers discloses that the input reactance varies directly with an input frequency and the input resistance varies according to the ratio of the input frequency to the slip frequency.

However, Chambers does not teach or suggest coil current control means that controls a motor to have a viscosity resistance by adjusting a ratio of a first off-state and a second off-state, during a period when no current is supplied to the coils.

In other words, Chambers does not address a ratio of a time period of the first off-state to the second off-state, but rather is concerned with the input reactance and the input resistance, both of which vary with a frequency and not with a time period in which that frequency is applied.

Accordingly, it is respectfully submitted that independent Claims 1 and 26 and each of the claims depending therefrom patentably distinguish over Besson and Chambers, either alone or in combination.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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